BEFORE THE

Federal Communications Commission

WASHINGTON, D.C.

In the Matter of	)	
	)	
Amendment of Parts 2 and 25 of the	)	
Commission's Rules to Permit Operation	)	ET Docket No. 98-206
of NGSO FSS Systems Co-Frequency with	)	
GSO and Terrestrial Systems in the Ku-Band	)	

SUPPLEMENTAL COMMENTS
of LORAL SPACE AND COMMUNICATIONS LTD.

Loral Space and Communications Ltd. ("Loral") submits these comments in response to the Public Notice released by the Commission[1/] seeking comment on the agreements related to Non-Geostationary Orbit ("NGSO") Fixed-Satellite Service ("FSS") systems recently concluded at the ITU-R Conference Preparatory Meeting ("CPM").

Loral supports the consensus reached at the CPM on power limits and related provisions to facilitate frequency sharing in the Ku-band between new NGSO FSS systems and Geostationary Orbit ("GSO") FSS systems. In addition, Loral recommends that the U.S. include in its proposals to WRC-2000, the limits and regulatory text agreed to with respect to these issues at the CPM. Loral also suggests regulatory means by which the Commission can implement the CPM decisions.

1/ Public Notice, DA 99-2733, rel. Dec. 6, 1999 ("Public Notice").

I. THE EPFD LIMITS IN THE CPM REPORT APPROPRIATELY PROTECT LORAL'S GEOSTATIONARY FIXED SATELLITE NETWORKS

Loral fully endorses the compromise reached at the CPM. The proposed power limits protect Loral's existing and planned GSO FSS networks but permits additional use of the GSO FSS spectrum by new NGSO FSS systems. The decisions of the CPM reflect the intensive effort since WRC-97 to determine appropriate rules for frequency sharing between NGSO FSS systems and GSO FSS systems. Loral has participated in the activities of the ITU Radiocommunication Bureau ("ITU-R") through the Joint Task Group ("JTG") 4-9-11 (assigned to evaluate the provisional epfd limits adopted at WRC-97) and through ITU-R Working Party 4A. Loral also has participated, through the ITU-R's Special Committee for Regulatory and Procedural Matters, in the process of developing regulatory mechanisms to implement the rules for protection of GSO FSS systems from NGSO FSS interference.

The JTG process developed EPFD limits using the following steps to determine: (1) what should be protected; (2) the protection criteria; and (3) what EPFD values (in the aggregate) would provide this protection. As a part of this process, Loral submitted detailed characteristics of certain of its sensitive GSO links. These links were evaluated from the perspective of the protection afforded by aggregate limits on NGSO FSS systems. In this process, virtually all of the links submitted by Loral were protected to the agreed criteria by the aggregate limits used to derive the single-entry EPFD validation limits contained in the CPM Report. Thus, based on consideration of the impact of the EPFD validation limits contained in the CPM Report on its own system, Loral can fully support the consensus achieved at this meeting.

In addition, Loral agrees with the approach recommended in the CPM report for demonstrating compliance with the validation limits. This approach provides that compliance with the single-entry validation limits should be verified by the ITU Radiocommunication Bureau ("BR") using software specified by the JTG. In particular, Loral supports this approach because the software evaluates NGSO FSS systems using a number of worst-case assumptions. Thus, the software computes a very conservative upper bound or interference from an individual NGSO FSS system and will therefore overestimate the amount of interference to GSO systems.

At the CPM, some additional sets of EPFD limits also were adopted to respond to concerns of certain GSO operators. These included limits for high-latitude operations, operational limits and additional operational limits. The operational limits and additional operational limits may be useful to ensure that GSO systems are protected from EPFDs of actual operating NGSO FSS systems. The operational limits, in particular, are useful to assure operators with large earth stations (greater than 4.5 m.) that they will not experience synchronization loss, and that if synchronization loss does occur, there will be additional rules governing NGSO FSS systems which will provide regulatory authorities with a mechanism for requiring and assuring compliance. The meeting also approved a third set of limits called Additional Operational Limits, which are a set of points as a function of time (similar to the EPFD limits adopted by WRC-97). In actual practice, NGSO FSS systems will be required to meet these limits as well.

As discussed in the following section, some of these $EPFD_{down}$ limits are to be evaluated using the BR software as part of the ITU notification process, and the other, more stringent limits, will apply only to the actual EPFD levels generated by a system into operational GSO earth

stations, and are therefore not subject to the software validation process. Possible regulatory approaches for these three types of limits are addressed below.

II. THE FCC SHOULD ADOPT REGULATIONS APPROPRIATE FOR EACH TYPE OF LIMIT

The purpose and use of the three sets of limits agreed to at the CPM call for varying regulatory treatment, both internationally and within the U.S.

The limits adopted, the practical means of determining compliance, and appropriate Commission rules are summarized in the following chart:

Type of Limit Limit (CPM Terminology)	*How limit is expressed*	*How compliance can be verified*	*Suggested FCC Regulatory Approach*
Validation	EPFD curve vs. % time	BR software using PFD masks submitted by administrations	NGSO FSS applicant provides information needed for ITU filing
Operational	Single value for 100% of time	Field measurements of NGSO interference into an operational GSO earth station	Adopt limits into rules; require NGSO FSS licensees to comply
Additional Operational	EPFD values (points) vs. % of time	Detailed modeling of system by applicants/operators using "real life" assumptions	Adopt limits into rules; require NGSO FSS licensees to comply

A. Validation Limits

The first set of limits are the validation $EPFD_{down}$ limits. These implement the goal of the JTG, described above, to have a set of limits that can be checked using a software tool as part of the ITU notification process. The Validation Limits comprehensively bound the full $EPFD_{down}$ statistics of each NGSO FSS constellation into a variety of GSO earth station antenna sizes.

In the international arena, compliance with the Validation Limits will be assessed by the BR, using the software tool discussed above. The specification for the BR software is complete and contained in an ITU-R Recommendation to be approved by the Radiocommunication

Assembly (ITU-R BO. Doc. 11/136). Software based on this specification is being developed with the goal of providing candidate software to the BR by mid-January 2000, so that selection of software can be approved at WRC-2000.[2/]

Because the software, as well as the input parameters provided by administrations will be available, Loral believes it would be sufficient for the Commission to require NGSO FSS applicants to submit the information required for the BR to assess compliance with the validation limits. Moreover, the Commission should include the validation limits in its rules. Administrations can then independently verify the BR results.

B. Operational Limits

The second set of limits are called operational $EPFD_{down}$ limits ("Operational Limits"). These limits are expressed as a maximum $EPFD_{down}$ for 100 percent of the time and are provided for operational GSO FSS earth stations of varying diameters. The operational limits are more stringent than the validation limits. They apply to each NGSO system in operation, and are intended to ensure protection of the larger GSO earth stations against loss of synchronization.

For these reasons, compliance with the Operational Limits cannot be assessed using the BR software. Once its system is in service, an NGSO operator will be bound to meet these limits at all times into operational earth stations. Should an operating NGSO system exceed these limits into an operational GSO earth station, the CPM agreed that all necessary steps to ensure that interference levels into that earth station are restored to the Operational Limits would have to be

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[2/] See CPM Report, §§ 3.1.5, 3.1.5.2.

taken by the NGSO network as expeditiously as possible. Such a determination would be made by individual administrations and their GSO operators.

As discussed in the CPM Report, a means of measuring $EPFD_{down}$ levels into operational GSO earth stations would assist operators and administrations in determining compliance with the Operational Limits in the event of a dispute. Loral will participate in the ITU-R to develop Recommendations regarding the measurement of EPFD levels into operational GSO earth stations.

As for regulation in the United States, Loral recommends that the Commission also include these operational limits in its rules and require that licensed NGSO FSS systems comply with these limits. Loral notes that the Commission already has at hand a number of ways to enforce its rules, including means of addressing non-compliance with the operational limits. If the Commission's rules are violated, the Commission has the authority to require that the operator reduce its power so as to meet specified limits, as well as the authority to require a system operator to cease operations if it fails to do so. The Commission also may fine its licensees for violation of its rules.

C. Additional Operational Limits

The third set of limits approved by the CPM are the additional operational $EPFD_{down}$ limits, which apply only to 3 and 10 meter GSO earth stations. These are specified as points of $EPFD_{down}$ with relation to specified percentages of time. The additional operational limits are more stringent than the validation limits, and afford GSO operators further assurance that NGSO FSS systems in operation will not cause them unacceptable interference. Because these limits address operating NGSO FSS systems, compliance with these limits cannot be assessed using the BR

software. Rather, the CPM determined that "the administration proposing the non-GSO system shall commit that, when in service, the interference from that system into any operational antenna [of 3 and 10 meter diameter] will meet the additional operational limits. . . "[3/] Such a commitment could be made in the process of an administration filing with the ITU RB.

Such statistics would be difficult to verify by measurement. This is because the values of the limits are so low that they could be lost in the noise of the GSO system. Moreover, software cannot be used to provide a regulatory verification of the additional operational limits, because, as explained above, the actual operational $EPFD_{down}$ statistics of a given NGSO system into a given GSO receiver will change over time. Therefore, Loral proposes that the Commission require each NGSO FSS system to commit, as part of the application process, to meeting the Additional Operational Limits once in service.

As indicated in the CPM Report, ITU-R Recommendations to assist administrations in making such commitments are needed, and a Resolution by WRC-2000 requesting development of Recommendations for checking compliance with the Additional Operational Limits is therefore proposed.[4/] Loral supports this proposal, and will work toward development of such methodologies during the next ITU-R study period.

[3/] CPM Report § 3.1.2.1.4(c); see also § 3.1.2.4.8.

[4/] CPM Report § 3.1.2.4.8. In particular, the CPM proposed that the ITU-R develop a new or revised Recommendation containing a methodology to determine the actual $EPFD_{down}$ statistics radiated by an NGSO system into a GSO FSS earth station. CPM Report §§ 3.1.2.1.4(c), 3.1.2.4.8.

D. Aggregate Interference

All of the limits discussed above are "single entry" limits, and apply to each NGSO FSS system individually. Recognizing that it is the aggregate interference produced by all NGSO FSS systems operating co-frequency that is of primary concern to GSO operators, the CPM proposes an example WRC-2000 Resolution, contained in Annex 2 of the CPM Report ("Example Resolution WWW"), as a possible regulatory mechanism for ensuring that the aggregate levels used to derive the single entry Validation Limits are not exceeded as multiple NGSO FSS systems commence service.[5/]

Example Resolution WWW provides that administrations operating NGSO FSS systems should take all possible steps to ensure that the actual aggregate interference into GSO networks caused by such systems do not exceed specified levels. It also provides that, should aggregate interference occur into an operational GSO earth station, such administrations shall expeditiously take all necessary measures to reduce the aggregate EPFD levels to the specified levels (or higher acceptable levels). It further requests the ITU-R to develop a methodology for calculating the aggregate $EPFD_{down}$ levels produced by multiple systems. Loral supports this approach.

Within the U.S., Loral suggests that the Commission, following the adoption of the above-specified methodologies, can calculate whether U.S.-licensed NGSO FSS systems, in the aggregate, are compliant with these aggregate values. With regard to the pending processing round, however, the Commission need not await development of these methodologies to adopt rules for U.S. licensees and license qualified applicants. The methodologies should be completed

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[5/] See CPM Report § 3.1.1.3.2 and Annex 2.

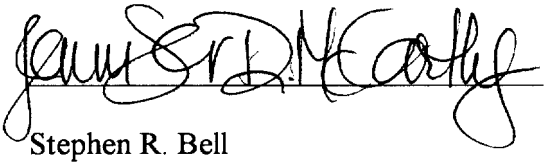
within the ITU-R in sufficient time to be utilized in relation to the U.S.-licensed systems that are implemented.

III. CONCLUSION

In conclusion, Loral supports the CPM Report with regard to the compromise reached by the CPM for the protection of GSO FSS earth stations from NGSO FSS downlink interference. If implemented as expressed in that Report, the WRC-97 mandate to adequately protect GSO FSS systems, while avoiding undue burdens on any of the services involved, will be achieved. Moreover, Loral encourages the Commission to adopt rules as outlined to implement the CPM results on this subject, as well as to adopt additional U.S. proposals to WRC-2000 consistent with these results.

Respectfully submitted,

LORAL SPACE & COMMUNICATIONS LTD.

By: 

Stephen R. Bell
Jennifer D. McCarthy
WILLKIE FARR & GALLAGHER
Three Lafayette Centre
1155 21st Street, N.W.
Washington, D.C. 20036-3384
Tel. (202) 328-8000

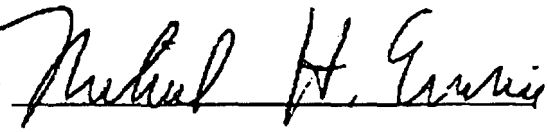
Its Attorneys

December 20, 1999

ENGINEERING CERTIFICATION

I hereby certify that I am the technically qualified person responsible for preparation of the engineering information contained in these Supplemental Comments of Loral Space & Communications Ltd.; that I am familiar with Parts 21 and 25 of the Commission's Rules; that I have either prepared or reviewed the engineering information contained in the underlying application; and that it is complete and accurate to the best of my knowledge.

Dated the 20th day of December 1999

By: 

Vice President Service Development & Engineering
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